

## Scientific Inquiry

- 1-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.**

### **1-1.3 Carry out simple scientific investigations when given clear directions.**

**Taxonomy Level:** 3.1-A Apply Factual Knowledge

**Previous/Future knowledge:** This is the first time students are introduced to procedures for carrying out simple scientific investigations. The development of these skills will serve as the basis for all future science investigations. In 2<sup>nd</sup> grade (2-1.1), students will carry out simple scientific investigations to answer questions. In 4<sup>th</sup> grade (4-1.3), students will summarize the characteristics of a simple scientific investigation that represent a fair test. In 5<sup>th</sup> grade (5-1.3), students will plan and conduct a controlled scientific investigation and manipulate variables. Students will further develop their skills with scientific investigations and technological design in middle school.

**It is essential for students to** follow clear, simple directions to carry out a *simple scientific investigation*. Clear directions for a scientific investigation may include instructions to:

- Identify the question to be investigated
- Make a prediction (possible answer to the question)
- Decide what materials are needed for the investigation
- List steps to follow to carry out the investigation
- Record observations
- Communicate observations (for example through verbal discussion, pictures, diagrams, note-taking, etc.)

To make a *prediction*:

- Make observations and think about what is known about the object or event.
- Tell what will happen next.

Making *observations* is a way of learning about the world around us.

- A *scientific observation* is one that anyone can make and the result will always be the same. For example, the plant is green, has three leaves, and feels smooth.
- An *unscientific observation*, or an opinion, is one that not everyone may agree on. For example, the flower is pretty.
- Observing does not mean just looking at something. It involves the use of several or all of the five senses (seeing, hearing, smelling, touching, and tasting) using appropriate observation methods for each sense, such as wafting an odor so that its smell can be described or gently touching the edges of seashells to determine their textures.
- Tasting in science should only be done with the permission of the teacher under controlled conditions.
- Observing helps to find out about objects (their characteristics, properties, differences, similarities) and events (what comes first or last, or what is happening at a particular moment).

NOTE TO TEACHER: Students do not need to devise their own questions for investigations. Data charts and graphs should also be prepared and provided for the students. The directions should be presented visually or orally in a manner that is suited to the students' levels of development.

**It is not essential for students to** devise the steps to carry out a scientific investigation or know the terms manipulated and responding variable.

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#### **Assessment Guidelines:**

The objective of this indicator is to *carry out* simple scientific investigations when given clear directions; therefore, the primary focus of assessment should be to follow the steps for completing a simple investigation when provided with the steps. However, appropriate assessments should also require students to *compare* observations and predictions; *identify* and *use* appropriate materials when conducting a simple scientific investigation; or *recognize* scientific observations.